

# Inside INEEL



*An inside look at cleanup at the Idaho National Engineering and Environmental Laboratory*

A facility managed and operated for the U.S. Department of Energy by Bechtel BWXT Idaho, LLC

## Focusing on Environmental Cleanup at the INEEL

In the high-mountain desert of southeast Idaho lies a government facility with a rich history of nuclear operations. A half-century ago, the United States government chose this Naval gunnery range site as the place where scientists and engineers would lead the nation in finding meaningful uses for the atom. This included the research and development of nuclear powered vessels for the U.S. Navy's fleet of ships and submarines, reprocessing spent nuclear fuel and storage for waste generated from work related to the Cold War.

While winning the Cold War has contributed immensely to world peace, it left a legacy of environmental contamination and waste that must be safely managed and cleaned up. Cleanup of the legacy of contamination and waste has been ongoing for more than a decade. Today, as the INEEL begins a new journey leading the nation's research and development work in advanced nuclear energy systems, Idaho's national laboratory has signed up to more aggressively clean up the environmental legacy from past operations.

This publication offers a glimpse of the accelerated environmental cleanup work being performed through a project called the Idaho Completion Project.

**Building on success**  
Bechtel BWXT Idaho – the contractor responsible for environmental cleanup at the INEEL for the Department of Energy – has created a project aimed at significantly reducing risk and accelerating cleanup at the INEEL by as much as 35 years. The Idaho Completion Project will manage identified risks until they have been cleaned up. In the process, the Idaho Completion Project has the potential to save taxpayers up to \$19 billion over previous cleanup



## Idaho Completion Project

Bechtel BWXT Idaho, LLC

*Many cleanup activities are under way at the INEEL. The Idaho Completion Project's goal is to complete the remaining cleanup on an accelerated schedule while significantly reducing risks to workers, the public and the environment. Workers begin operations for the demonstration retrieval of buried waste (top), dismantle equipment (middle), and remove contaminated piping for offsite disposal (bottom).*

plans. Its goal is to complete the majority of cleanup by 2012. Unlike the INEEL's research mission, which is expected to grow in the future, environmental cleanup will close down its

operations and major facilities as it completes work. Now and in the coming years, expect to hear positive things about how Idaho Completion Project workers are handling

the challenge of accelerating cleanup and reducing risks to protect the public and the environment. Taking on the national laboratory's twin missions continues the tradition of excellence at the INEEL.



In the past three years, the pace of environmental cleanup has dramatically accelerated as the number of safety incidents at the INEEL site has steadily declined.

Nearly 75 percent of potentially contaminated INEEL sites have been evaluated and cleaned up as required by law. Inventories of low-level and mixed hazardous and radioactive waste have – and continue to be – significantly reduced. Cleanup work has been completed at both the Test Reactor Area and the Central Facilities Area.

# Cleanup Highlights

## Cleanup pace accelerating

During 2004, expect to see additional cleanup work completed at other facility areas, including the Power Burst Facility.

Transuranic waste that has been in storage for nearly 30 years is being shipped to New Mexico. The Idaho Completion Project shipped more than 15,000 drums of transuranic waste out of Idaho for disposal ahead

of schedule. All of the spent nuclear fuel that was stored in five aged, concrete-walled storage pools has been consolidated to the Idaho Nuclear Technology and Engineering Center (INTEC) and placed in safer dry storage.

In the past year, progress has been made to remove liquid radioactive waste from underground storage

tanks – one of the highest priorities of the state of Idaho. Five tanks that once stored highly radioactive liquid waste are empty, and three of these tanks have been cleaned to state-approved standards.

When the U.S. Department of Energy implemented new strategies for faster and less costly cleanup throughout the nation's DOE sites in February 2002, Bechtel BWXT Idaho committed to accelerate the pace of cleanup, reduce environmental risks, and complete the majority of the INEEL cleanup in a decade.

### Shipping waste out of Idaho

In the late fall of 2002, Idaho Completion Project workers finished the shipment of more than 15,000 drums of waste to the Waste Isolation Pilot Plant in New Mexico. With this accomplishment, Bechtel BWXT Idaho achieved a court-ordered deadline two months early. The remainder of the stored transuranic waste will be processed for shipment at the privatized Advanced Mixed Waste Treatment Facility.

Shipping waste out of state to a long-term disposal site enables

the INEEL to comply with the Idaho Settlement Agreement between the state of Idaho, the U.S. Navy and DOE. The agreement defines timetables for treating and removing waste from the INEEL.

Since October 1999, over 3,400 cubic meters of mixed waste – waste that is contaminated with both radioactive and chemical constituents – have been treated and disposed of outside of Idaho. The removal of this waste backlog has allowed five storage areas to be closed, eliminating the need and costs for maintenance and surveillance. All of the mixed low-level waste backlog will be removed from the INEEL by the end of fiscal year 2004.

Low-level waste inventories on site are being reduced. Since October 1999, over 17,200 cubic meters of low-level radioactive waste has been disposed of in a landfill at the INEEL, or at offsite facilities. Today, approximately 1,000 cubic meters of low-level waste are staged awaiting disposal in 2004.

### Demonstrating waste retrieval

At the Pit 9 burial site, Idaho Completion Project workers have begun waste retrieval at a facility that will demonstrate how to remotely retrieve buried waste from part of the one-acre pit. Pit 9 is located within the 97-acre Subsurface Disposal Area in the western section of the Radioactive Waste Management Complex.

The Subsurface Disposal Area contains pits and trenches where mixed transuranic and low-level wastes were buried between 1954 and 1970. Much of the transuranic waste buried at the Subsurface Disposal Area consists of contaminated clothing and equipment. The waste – shipped to the INEEL from the Rocky Flats Plant in

Colorado – was the result of Cold War nuclear weapons production.

One concern is groundwater contamination underneath the Subsurface Disposal Area. The major source of groundwater contamination beneath the Subsurface Disposal Area is from organic solvents found in the buried waste. Vapors from these solvents are removed with a vacuum system that pulls the vapors to the surface and destroys them. Since operations began in January 1996, more than 145,000 pounds of these vapors have been removed from under the earth's surface, including more than 85,000 pounds of carbon tetrachloride.

*The Radioactive Waste Management Complex, shown in the aerial photograph below, includes the 97-acre Subsurface Disposal Area (in foreground), which contains pits and trenches where waste, primarily from other DOE sites, was buried between 1954 and 1970. This site represents a very small portion of the 890 square miles of INEEL land.*



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*Transuranic waste from the INEEL is being disposed of at the Waste Isolation Pilot Plant (above). Idaho Completion Project workers sample mixed low-level waste for repackaging. The remaining inventory of mixed low-level waste onsite will be removed by 2004, two years ahead of schedule (top).*



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## Emptying storage tanks ahead of schedule

Idaho Completion Project employees are making rapid progress on removing the rest of the liquid radioactive waste stored above the Snake River Plain Aquifer. Last year, waste was removed from the fifth of 11, 300,000-gallon tanks in the liquid radioactive waste tank farm at INTEC. The storage tanks were used to store the radioactive liquid waste generated during the reprocessing of spent fuel, which was done during the Cold War to extract uranium, and plant decontamination work. Most of the liquid has been calcined, which reduces the volume and converts it

to a more stable solid form, and placed in storage bins. The current step in closing the tank farm is to clean the tanks to remove as much contamination as possible before final closure. An innovative high-pressure spray system is used to wash the tanks and remove contamination from the walls and bottoms of the tanks. In the next year, an additional tank will be cleaned to standards approved by the state of Idaho. Under the accelerated cleanup plan, the goal is to empty and close all 11 storage tanks by 2012.

*Octagonal tank vaults being constructed at the Idaho Nuclear Technology and Engineering Center's tank farm in 1957.*



*The tank farm contains eleven 300,000-gallon storage tanks. Five of the tanks have been emptied and the remaining tanks will be emptied and cleaned by 2012, four years ahead of previous schedules.*

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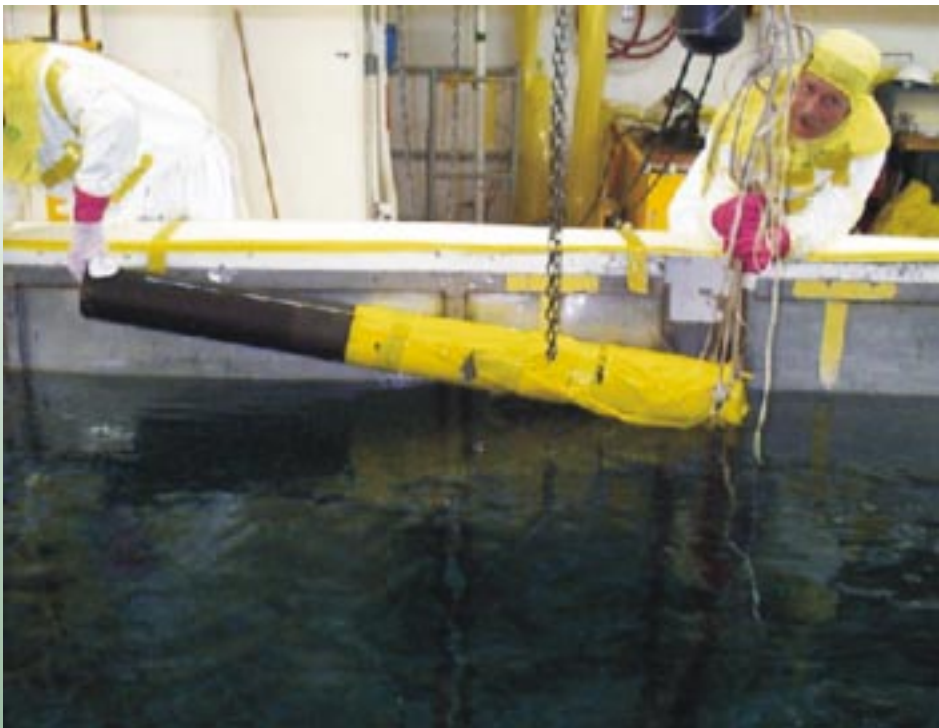
## Transferring spent nuclear fuel to safer storage

Spent nuclear fuel has been stored for more than 40 years in five underwater storage basins. Today all of the spent nuclear fuel from the INEEL's five aged underwater storage basins has been removed and placed into safer dry storage. To be successful, this project has overcome challenges by sharing innovative solutions to technical

problems, preparing integrated schedules, and efficiently utilizing shared resources. Under an agreement with the state of Idaho, all spent nuclear fuel at the INEEL must be in dry storage by 2023. Now, under the accelerated cleanup plan, Bechtel BWXT Idaho anticipates completing this work by 2012.



*More than 105 nuclear fuel units from the Materials Test Reactor canal and 23 fuel units from the pool at Test Area North were transferred to dry storage facilities.*



*Idaho Completion Project workers remove debris from the canal at the Materials Test Reactor.*



*Idaho Completion Project workers removed more than 2,400 spent fuel elements from underwater storage at the Power Burst Facility.*



## Changing the skyline

A key component of accelerating cleanup at the INEEL is the removal of buildings and structures that are no longer needed, many of which are contaminated.

Over the past two years, crews have removed more than 200,000 square

feet of buildings and structures, reducing facility management costs. During the next few years, additional buildings and structures will be removed from service and torn down. Some facilities may be decontaminated and used to support new missions at the INEEL.



Test Area North continues to be a focus point for demolition work at the INEEL. More than 50 percent of the tanks managed under the Voluntary Consent Order, an agreement signed by DOE and the state of Idaho, have been characterized and are now undergoing closure.



## Snake River Plain Aquifer

### Monitoring the Snake River Plain Aquifer

Over the years, operations at the INEEL have contaminated portions of the aquifer with hazardous chemicals and radioactive substances. Scientists closely monitor the groundwater leaving the INEEL's boundaries to ensure that it continues to meet the standards established in the federal Safe Drinking Water Act and does not pose a risk to water users in neighboring communities.

The depth of the aquifer's water table is about 200 feet at the INEEL's northern border and increases gradually to about 900 feet at the INEEL's southern border. The aquifer is about 4,000 feet thick at the center of the Snake River Plain.

More than 200 monitoring wells are used to regularly collect groundwater

samples around the INEEL. The United States Geological Survey and the state of Idaho also sample the wells. Samples provide data for evaluating the groundwater's quality, which indicates the effectiveness of cleanup efforts and helps scientists understand the nature of the aquifer.

Other steps are being taken to protect the groundwater. More than 119 million gallons of contaminated groundwater has been treated through innovative INEEL processes. Older disposal ponds have been

replaced with lined evaporation ponds. Dikes and other controls are being used to reduce or eliminate water sources that can move contaminants into the ground. Injection wells are no longer used, and wastewater that is disposed of in sewage drain fields and disposal ponds no longer carries contaminants in concentrations that pose a risk.

*The eastern Snake River Plain Aquifer is extensively monitored to provide the most comprehensive information possible for making effective cleanup decisions to ensure that the aquifer is protected for the long-term.*

